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Volume 21, Issue 4

Network Transformation and GenAI

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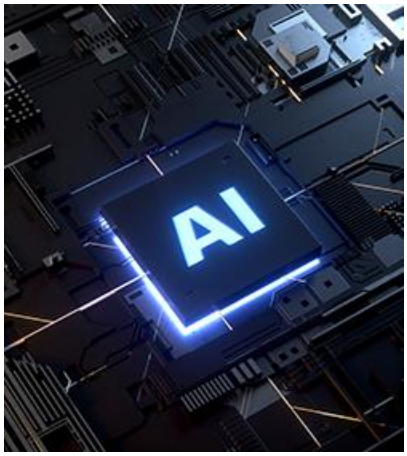

In the following months, you will see a lot of talk about transforming networks by the application of GenAI technology. This is just the latest in a trend where network transformation has come to mean doing the one single thing that changes everything. Right now, that one thing is applying GenAI. GenAI is a powerful technology that offers tremendous benefits somewhat complicated by some serious side effects. It is hard to predict what technologies will be added to our tool kit tomorrow. But it is highly likely that new powerful ones will appear. Thus, true transformation is not doing one single thing even if that one thing is GenAI. Rather, it is implementing a constant innovation process. That is, an innovation funnel similar to a sales funnel.

What is a Network?

In the past there was a clear distinction between communications and computing. Over time, that distinction has become blurred. There are very few computers that operate in isolation. And there are very few networks that don't have computers as basic components. The discussion below focuses on telecommunications. A compute centric analysis would be similar in many ways.

Recent History of Network Transformation

We have gone through several generations of transformation. Each generation is characterized by a new technology approach. Each approach is positioned by itself as something that is too important not to focus on. A focus that tends to block out everything else. For each approach, consultants can explain why you need it. Vendors can provide products for it. System integrators can help you implement it. There are conferences, industry groups and training programs about

it. Some recent examples include: Digital Twin, Dev Ops, Edge Computing, Cloudification, NFV, SDN, and SDR.

What started as one big technology change that could produce fundamental changes to your network, became a series of profound technology changes. Some will say that GenAI is a much bigger technology jump than those that came before. That it is, in some ways, disrupting the previous tech jumps.

And GenAI is, in fact, disrupting the previous tech jumps. But others will argue that each one of the jumps that preceded GenAI was a much bigger jump than what came before. Others argue that the existing form of GenAI is just the beginning. That new jumps are coming that will be bigger. Some predict that GenAI will gain orders of magnitude greater capabilities. Others speculate on dramatic reductions in power consumption. But, if history is any guide, there will be a next bigger jump and it is likely not to conform to any of today's predictions.

Network Transformation Today

Does this accelerating rate of technical change mean that we need to throw out the concept of Transformation? No. But we do need a Next Generation Transformation Process (NGTP). One that recognizes:

- Chain of ongoing dramatic technologies coming to market.
- Many valuable innovation opportunities to be mined from earlier technologies.

The best way to develop this NGTP is to take the ladder of abstraction up to the next level. That is, define the transformation process not as focused on a single new technology, but rather, on instituting a process. A process to take advantage of both the chain of ongoing dramatic technologies coming to market as well as mining the innovation opportunities from earlier technologies. Doing that suggests that the NGTP focuses on capturing and deploying these innovation opportunities in a way that:

- Maximizes benefits.
- Minimizes bad side effects.
- Continues to capture benefits from previous generations of technology.

Portfolio Management Approach Needed

Some may think that the best way to do this is to pick a single application of each technology as they come along. The problem is that innovation involves risk — technical risk and business risk. There may be technical problems with a particular application of a technology. It may be too early. The particular application for the technology may turn out not to be a good fit for the technology. The application may require knowledge and skills the organization does not have. On the business side, the technology may work, but not deliver the benefits expected. There may be unexpected consequences including negative side effects. It may be too hard for the organization

to maintain. In general, the best way to address this kind of risk is to use a portfolio management technique. And that is definitely true with the NGTP. What that means is not putting all your eggs

in one basket. Develop a portfolio of innovative applications. Applications that apply the current technology jump, as well as some that employ earlier technologies. Start small with each. Track them in a series of steps weeding out those that don't pan out. This can be thought of as an innovation funnel.

Next Generation Transformation Funnel

The first step in creating an innovation funnel is that senior management has to make it clear that innovation is being sought and will be supported. If this is done correctly, a lot of good ideas will surface. Some will come from people inside the organization and some will come from external sources.

Internal people will need assurance that they will not suffer bad consequences from bringing forward an innovation proposal, even if that proposal doesn't pan out. External sources need to be met as potential partners and treated accordingly. In both cases, effort must be made to prevent the appearance or an actual "not invented here" syndrome. This requires an organization that communicates well. The whole organization has to be in sync.

Successful innovation ecosystem leaders will arrange the resulting flow of innovation proposals in a funnel. This will be a flow because internal and external people will keep thinking. To coin a modification of a previous network transformation technology (Dev Ops) acronym, such a funnel would produce Constant Innovation - Constant Deployment (CI-CD). Today, that would include both GenAI applications and other technologies as well.

The flow will be full of good ideas. Unfortunately, many of those good ideas will not pan out. What is needed is a way to organize the proposals into a portfolio and, over time, sort out the winners. This is done by creating organization structures, policies and procedures that work like a funnel. Constantly bringing in good ideas. Assessing them for technical feasibility, organization benefit, etc. Picking the best for early Proof of Concept (POC) work. Assessing the POC's. Picking the most promising POC's for further prototyping. Assessing the prototypes. Picking the best prototypes for field trials. Assessing the field trials. Picking the best field trials for full scale deployment.

To make the funnel work, there must be appropriate budgets for each level in the funnel and leaders at each level who are rewarded based on the quality of the flow reaching deployment, rather than the success or failure of a particular proposal. For external partners, funded POC's are important.

This constant innovation and deployment process has been done before. One example is Google when it was going through its steepest growth curve. When a new network architecture was rolled out, work was already starting on the next network architecture. The architecture just rolled out would be in production for approximately six months before the next architecture was rolled out. This was driven by the rapid growth in business that created quantum step requirements in capacity and performance. Each cycle was a magnet for innovative proposals. This is an extreme example. Few organizations will have such a fast cycle time. Still, it illustrates what can be done. Currently, Google has developed and deployed it's own GenAI data centers

based on it's own chips, running it's own LLM's. Each of these (data centers, chips, LLM's) can be seen as a result of an innovation funnel.

Another current example is a friend of mine who works in the electric grid industry. He is investigating previous generations of neural network technology applied to sustainable operation of electric grids. Part of the reason for looking at previous generations of technology is to avoid problems that GenAI has with hallucinations.

Conclusion

Currently, there is a lot of focus on transforming networks by application of GenAI technology. This is just the latest in a trend where network transformation has come to mean doing the one single thing that changes everything. Right now, that one thing is applying GenAI. GenAI is a powerful technology that offers tremendous benefits. But now, true transformation is not doing one thing, even if that one thing is GenAI. Rather, it is an NGTP that implements a constant innovation funnel process. The presence of an NGTP will be a key indicator of a healthy network for today and tomorrow.